

OPERATIONALLY RESPONSIVE SPACE **ORS**



Overview

Assured Space Power Focused on Timely Satisfaction of Joint Force Commanders' Needs

The Joint ORS Office is taking a new approach to risk and mission assurance to rapidly deploy capabilities that are good enough to satisfy warfighter needs across the entire spectrum of operations, from peacetime through conflict.

Background

On May 21, 2007 the Deputy Secretary of Defense and Executive Agent for Space established the Operationally Responsive Space (ORS) Office as a proactive step to adapt space capabilities to changing national security requirements and to be an agent for change across the community.

Approach

The Joint ORS Office is working with the broader space community to provide “assured space power focused on timely satisfaction of Joint Force Commanders’ needs.” The end state of the ORS concept is the ability to address emerging, persistent, and/or unanticipated needs through timely augmentation, reconstitution, and exploitation of space force enhancement, space control, and space support capabilities.

The ORS Office is implementing a rapid innovation process using a Modular Open Systems Architecture (MOSA) to facilitate rapid assembly, integration, and test (AI&T), deployment, and operations of space assets into the current space architecture in operationally relevant timelines. The ORS Office focuses on material (spacecraft, launch, range, payloads) and non-material solutions (business model, acquisition, policy, industrial base, training, command and control, tasking, exploitation, processing, & dissemination, concept of operations), and collaborates with national and international agencies to leverage existing investments and develop long-term partnerships.

Results

- 1 Delivers capabilities to the warfighter in operationally relevant time frames.
- 2 Provides the nation with a mix of simple one mission satellites that complement strategic assets.
- 3 Drives down overall costs and development timelines.
- 4 Capitalizes on emerging and innovative capabilities.
- 5 Introduces new operational concepts for increased flexibility.
- 6 Engages the entire space community through collaboration and coalition opportunities.
- 7 Invigorates the science and engineering skill base.

Please learn more
about Operationally
Responsive Space at:

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Operationally Responsive Space-1

Mission

ORS-1 was initiated at the direction of the Commander, U.S. Strategic Command and the DoD Executive Agent for Space to address a U.S. Central Command (USCENTCOM) need for enhanced battlefield awareness. ORS-1 is the first and only dedicated space intelligence capability for USCENTCOM, introducing Operationally Responsive Space as a new paradigm for the Department of Defense.

Results

ORS-1 provides USCENTCOM an assured ISR capability that cannot be preempted by support to other users. It is an enabler for sustaining operations and objectives in a highly volatile region and is laying the path for future rapid reaction space systems. The team doggedly adhered to a “**good enough to win**” approach to deliver a capability that was affordable, rapid, and risk tolerant.

Operationally Responsive Space-2

Mission

The ORS Office is fully invested in producing an ORS architecture that is redefining the space enterprise. The end state vision of the ORS Concept consists of reconfigurable, modular systems with standard interfaces that are interoperable with the existing ground systems architecture. The goal is to be able to develop, assemble, integrate, launch and operate “good enough” systems rapidly (less than one year for a new system). This concept will be demonstrated in the ORS-2, Tier-2 Enabler Mission.

The ORS-2 Mission will:

- 1 Conceptualize and demonstrate a new business model for small satellites.
- 2 Advance and provide incentive for enabling architectural standards.
- 3 Open the trade space industry providers to contribute space capabilities.
- 4 Define the framework and processes to rapidly deliver and rapidly deploy space capabilities to the warfighter.

Operationally Responsive Space-3

Mission

The ORS Office is dedicated to building the enabling infrastructure allowing for decreased launch timelines and overall cost savings. The ORS-3 Mission will deliver an Integrated Payload Stack to a 500km, 40.5 degree circular orbit using a Minotaur I launch vehicle (LV). The IPS consists of a larger space vehicle (SV) integrated on CubeStack wafers that are filled with numerous CubeSats. Once the larger SV has separated, the CubeSats will be deployed in a manner that avoids risk of re-contact. Enabling technologies such as automated LV trajectory targeting and range safety process will be demonstrated. These enablers not only focus on the ability to execute a rapid call up mission, they reduce engineering hours from months to days in both cases, resulting in decreased launch costs.

The ORS-3 Mission will:

- 1 Demonstrate alt execution methods for launch services that reduces overall launch costs using an FAA license.
- 2 Demonstrate new hardware that allows small launch vehicle to fly multiple CubeSats in a manner that is benign to the primary mission.
- 3 Demonstrate an Autonomous Flight Safety Assembly which will have the most enduring impact on how flight safety is achieved for all launch systems.

Operationally Responsive Space-4

Mission

The ORS Office with support from the Sandia National Laboratories is developing a small launch vehicle known as Super Strypi. The goal is to deliver payloads in the range of 300kg to Low Earth Orbit (LEO). This effort includes the development of three new solid rocket motors from the venerable rocket motor and engine provider Aerojet. The University of Hawaii's HiakaSat will fly as the primary payload on the Integrated Payload Stack with an additional 13 CubeSats flying as secondary payloads. Super Strypi is unique in that it is spin stabilized throughout the entire flight. This sounding rocket approach keeps the system as simple as possible and eliminates the significant amount of engineering hours required on guided rockets to develop control algorithms and testing. ORS-4 will launch from the Navy's Pacific Missile Range Facility, Kauai, Hawaii.

The ORS-4 Mission will:

- 1 Demonstrate alternative launch vehicle concept that reduces total mission cost through simple and repeatable process.
- 2 Move launch vehicle processing from heavy reliance on engineering hours to technician hours.
- 3 Reduce launch vehicle integration and processing timelines, contributing to responsive and lower cost launches.